REMARKS

The Office Action dated September 26, 2007 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 21, 32, 36, 38, and 40-42 have been amended to more particularly point out and distinctly claim the subject matter of the invention. Claim 29 has been canceled without prejudice or disclaimer. No new matter has been added. Claims 21, 23-28, 30-34, 36-38, and 40-42 are currently pending in the application and are respectfully submitted for consideration.

The Office Action rejected claims 21, 23-26, 28-30, 38, and 40-42 under 35 U.S.C. §102(e) as being anticipated by Zangi et al. (U.S. Patent No. 6,775,322, hereinafter "Zangi"). The rejection is respectfully traversed for at least the following reasons.

Claim 21, upon which claims 23-31 are dependent, recites a receiving station. The receiving station includes a signal filter in communication with a signal receiving antenna, a signal estimator in communication with the signal filter, a signal optimizer in communication with the signal filter, and a decision feedback sequence estimator in communication with the signal optimizer. The decision feedback sequence estimator includes a prefilter, a summing element in communication with the prefilter, a feedback filter in communication with the signal optimizer and the summing element, and a maximum likelihood sequence estimator in communication with the summing element.

Interconnection of the prefilter, the feedback filter, the maximum likelihood sequence estimator, and the summing element cooperatively operate to permit concurrent interference and prefilter operations to be performed.

Claim 32, upon which claims 33-37 are dependent, recites a method including receiving a data vector, forming optimized feed forward filter parameters from the data vector, forming optimized feedback filter parameters from the data vector, applying the optimized feed forward filter parameters to a feed forward filter to define filter characteristics of the feed forward filter, applying the optimized feedback filter parameters to a feedback filter to define filter characteristics of the feedback filter, and simultaneously performing interference cancellation and pre-filtering operations on the data vector through operation of the feed forward and feedback filters. The receiving of a data vector comprises receiving a plurality of data vectors on a corresponding plurality of receiving chains.

Claim 38, upon which claims 39-42 are dependent, recites a receiving station for a communication system. The receiving station includes signal filter means in communication with a signal receiving antenna, signal estimator means in communication with the signal filter means, signal optimizer means in communication with the signal filter means, and interference cancellation means in communication with the signal optimizer means. The interference cancellation means comprises a prefilter, a summing means for summing in communication with the prefilter, a feedback filter means for filtering in communication with the signal optimizer means and the summing

means, and a maximum likelihood sequence estimator in communication with the summing means. Interconnection of the prefilter, the feedback filter means, the maximum likelihood sequence estimating means, and the summing means cooperatively operate to permit concurrent interference and prefilter operations to be performed.

As will be discussed below, Zangi fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the features discussed above.

Zangi discloses a method is disclosed for computing a coefficient of a finite impulse response pre-filter applied prior to a decision algorithm in an equalizer having adjustable filter coefficients. The filter may be used in a decision feedback sequence estimation (DFSE). According to Fig. 3 of Zangi, the equalizer 100 includes a pre-filter 102, a summer 106, a decision algorithm 108, a feedback filter 104, and a processor 120 which includes an adaptive algorithm 124 and a channel estimator 122.

Applicants submit that Zangi fails to disclose or suggest all of the elements of the present claims. For example, Zangi does not disclose or suggest, at least, "interconnection of the prefilter, the feedback filter, the maximum likelihood sequence estimator, and the summing element cooperatively operate to permit concurrent interference and prefilter operations to be performed," as recited in claim 21 and similarly recited in claim 38. Similarly, Zangi fails to disclose or suggest "simultaneously performing interference cancellation and pre-filtering operations on the data vector through operation of the feed forward and feedback filters," as recited in claim 32.

Therefore, according to embodiments of the present invention, interference cancellation and decision-feedback-equalization prefiltering operations are performed jointly, thereby providing single-step performance of such operations. The joint operations result in reduced complexity as the calculations required in the equalization process increase only linearly with increases in the number of transmit antennas used in the MIMO communication system.

Zangi, on the other hand, does not disclose or suggest that interference cancellation and pre-filtering operations are performed concurrently or simultaneously. Zangi merely discloses that the pre-filter 102 receives the signal r(k) as an input and that the output of the pre-filter 102 is input to the decision algorithm 108 (Zangi, Column 4, lines 38-40 and Column 11, lines 8-12). However, Zangi does not disclose, either explicitly or implicitly that the interference cancellation and pre-filtering operations are performed simultaneously.

Therefore, Applicants submit that Zangi does not disclose or suggest, at least, "interconnection of the prefilter, the feedback filter, the maximum likelihood sequence estimator, and the summing element cooperatively operate to permit concurrent interference and prefilter operations to be performed," as recited in claim 21 and similarly recited in claim 38. Similarly, Zangi does not disclose or suggest "simultaneously performing interference cancellation and pre-filtering operations on the data vector through operation of the feed forward and feedback filters," as recited in claim 32.

Accordingly, Applicants respectfully request that the rejection of claims 21, 32, and 38 be withdrawn.

Claims 23-28, 30, 31, 33, 34, 36, 37 and 40-42 are dependent upon claims 21, 32, and 38, respectively. As such, claims 23-28, 30, 31, 33, 34, 36, 37 and 40-42 should be allowed for at least their dependence upon claims 21, 32, and 38, and for the specific limitations recited therein.

Claims 27 was rejected under 35 U.S.C. §103(a) as being unpatentable over Zangi in view of Taylor et al. (U.S. Patent Application Publication No. 2002/0197987, hereinafter "Taylor"). The Office Action alleged that Zangi teaches every feature of the claimed invention, with the exception of a deinterleaver in communication with an output of a MLSE and a depuncturer in communication with a deinterleaver and a channel decoder in communication with the deinterleaver. The Office Action then cited Taylor as allegedly curing the deficiencies in Zangi and asserted that it would have been obvious to incorporate such a teaching in Zangi in order to recover the originally transmitted signal. Applicants respectfully traverse the rejection at least for the reasons set forth above in relation to the anticipatory rejection over Zangi and for the reasons discussed below.

Zangi is discussed above. Taylor discloses a method for transparent data transmission for wireless/cellular communication system. An analog signal from a modem or other source is converted at a remote station to a digital bit stream in accordance with a memoryless compaction rule. The resultant bit stream is then

transmitted through a transparent channel that includes a wireless cellular-telephone link. At the base station, that bit stream is transmitted over a public-switched-network span.

Claim 27 is dependent upon claim 21. As discussed above, Zangi fails to disclose or suggest all of the elements of claim 21. Furthermore, Taylor fails to cure the deficiencies in Zangi, as Taylor also fails to disclose or suggest "interconnection of the prefilter, the feedback filter, the maximum likelihood sequence estimator, and the summing element cooperatively operate to permit concurrent interference and prefilter operations to be performed." Therefore, the combination of Zangi and Taylor fails to disclose or suggest all of the elements of claim 27. Additionally, claim 27 should be allowed for at least its dependence upon claim 21 and for the specific limitations recited therein.

Claims 31-36 appear to have been rejected under 35 U.S.C. §103(a) as being unpatentable over Zangi in view of Malkemes et al. (U.S. Patent Application Publication No. 2002/0106040, hereinafter "Malkemes"). Applicants note that the Office Action only explicitly stated the claims 31 and 32 are rejected, however the explanation of the rejection appears to address claims 33-36 as well. If Applicants have mischaracterized this rejection, it is respectfully requested that a new non-final Office Action be issued clearly explaining the intended rejections. The Office Action asserted that Zangi discloses all of the elements of the claims, with the exception of a receiving station comprising a plurality of receive chains that correspond to a plurality of signal receiving antennas configured to receive and transmit a plurality of signal vectors to the plurality of

receive chains. The Office Action then cited Malkemes as allegedly curing the deficiencies of Zangi. This rejection is respectfully traversed for at least the following reasons.

Zangi is discussed above. Malkemes teaches a method and apparatus for reducing multipath distortion in a wireless LAN system with a plurality of antennae 102, and tuners 108 and 110 that provide received signals to a timing recover circuitry 112 and a spatial diversity combiner 150.

Claim 31 is dependent upon claim 21. As discussed above, Zangi fails to disclose or suggest all of the elements of claim 21. Furthermore, Malkemes fails to cure the deficiencies in Zangi, as Malkemes also fails to disclose or suggest "interconnection of the prefilter, the feedback filter, the maximum likelihood sequence estimator, and the summing element cooperatively operate to permit concurrent interference and prefilter operations to be performed." Therefore, the combination of Zangi and Malkemes fails to disclose or suggest all of the elements of claim 31. Additionally, claim 31 should be allowed for at least its dependence upon claim 21 and for the specific limitations recited therein.

With respect to claim 32, Applicants submit that the combination of Zangi and Malkemes fails to disclose or suggest "simultaneously performing interference cancellation and pre-filtering operations on the data vector through operation of the feed forward and feedback filters," as recited in claim 32. As discussed above, Zangi does not disclose or suggest at least this feature of the claims. In addition, Malkemes does not

cure this deficiency in Zangi, as Malkemes also fails to disclose or suggest simultaneously performing interference cancellation and pre-filtering operations on the data vector through operation of the feed forward and feedback filters. Thus, the combination of Zangi and Malkemes does not disclose or suggest all of the elements of claim 32. Accordingly, Applicants request that this rejection be withdrawn.

Claim 37 was rejected under 35 U.S.C. §103(a) as being unpatentable over Zangi, in view of Malkemes and further in view of Taylor. The Office Action took the position that Zangi and Malkemes disclose all of the elements of the claim, with the exception of a de-interleaver connected to a de-punctuator, the de-punctuator being connected to a channel decoder. The Office Action then cited Taylor as allegedly curing this deficiency in Zangi and Malkemes. This rejection is respectfully traversed for at least the following reasons.

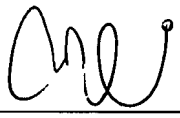
Claim 37 is dependent upon claim 32. As discussed above, the combination of Zangi and Malkemes fails to disclose or suggest all of the elements of claim 37. In addition, Taylor fails to cure the deficiencies in Zangi and Malkemes as Taylor also fails to disclose or suggest "simultaneously performing interference cancellation and pre-filtering operations on the data vector through operation of the feed forward and feedback filters," as recited in claim 32. Accordingly, the combination of Zangi, Malkemes, and Taylor fails to disclose or suggest all of the elements of claim 37. Claim 37 should also be allowed for at least its dependence upon claim 32, and for the specific limitations recited therein.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art fails to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 21, 23-28, 30-34, 36-38, and 40-42 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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